Operative Techniques in Thoracic and Cardiovascular Surgery

The Technique of Omentum Harvest for Intrathoracic Use

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The greater omentum, due to its size and dependable blood supply, has long been utilized for treating pleural space problems. It has many unique properties that are not shared by other types of flaps such as muscle, pericardium, or pleura. The omentum has been shown to have angiogenic factors that can increase neovascularization of the tissue that is being repaired and it is also felt to have specific immunologic properties that allow it to augment local lymphocyte counts.[1,2] Additionally, it does not cause the same cosmetic or functional impairments as muscle flaps and its bulk and shape allow it to fill large spaces.

The omentum is a versatile organ and its uses include treating bronchial-pleural fistulas, space defects associated with empyemas, threatened airway anastomoses, esophagogastrostomy after esophagogastrectomy, poststernotomy mediastinal infections, and tracheoesophageal fistulas. Contraindications for omental pedicle flaps include previous major abdominal operations, cirrhosis with portal hypertension, and omental disorders. In addition, the omental "bulk" may not be sufficient for repairing many intrathoracic complications in extremely cachectic patients.

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Operative Technique

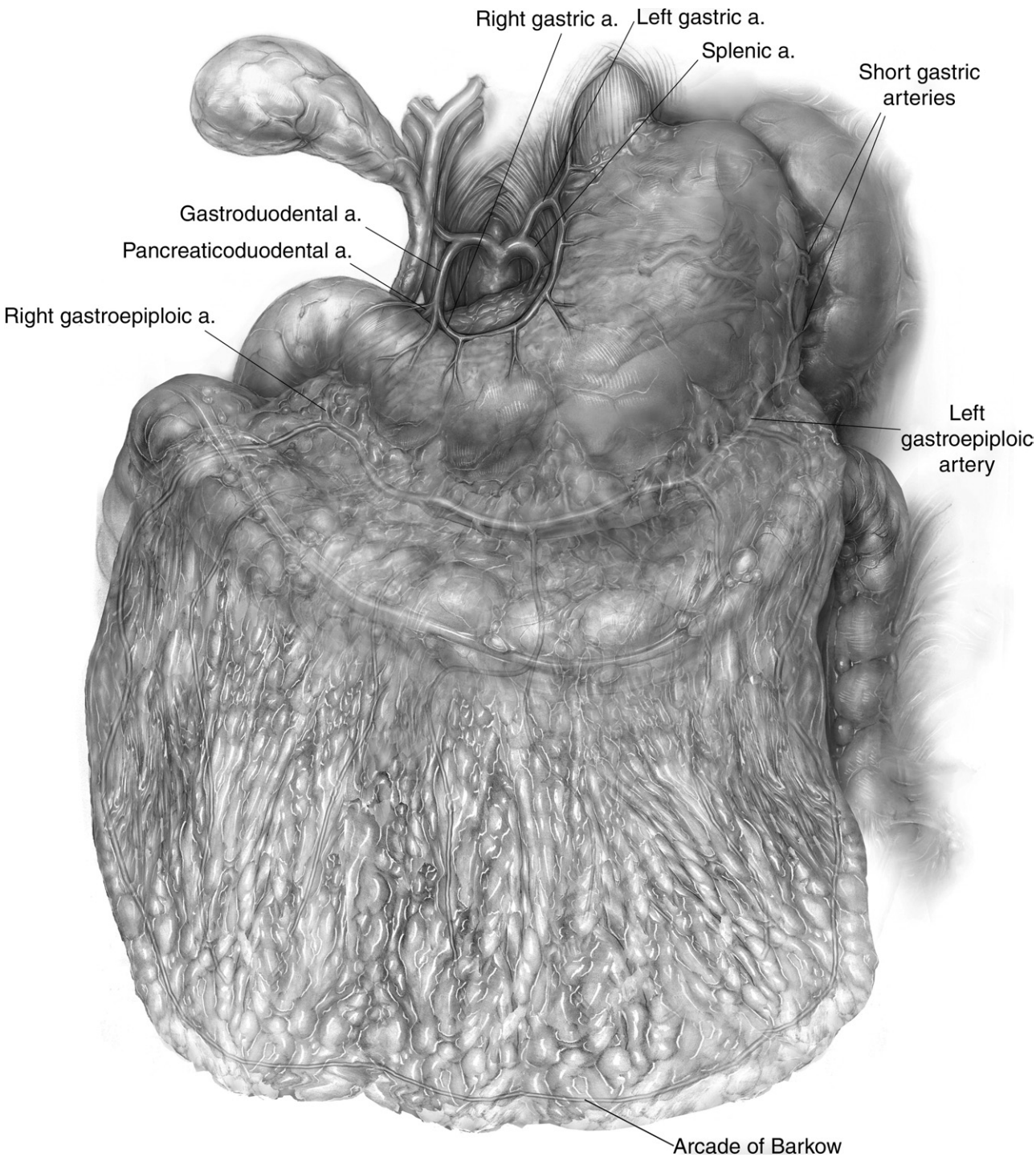

Figure 1 The preparation of the omental flap is initiated most commonly through an upper midline laparotomy incision. Other approaches include laparoscopic or transdiaphragmatic techniques. Laparoscopy has the advantage of good visualization with smaller incisions and less postoperative pain than a laparotomy.[3,4] The transdiaphragmatic approach avoids an abdominal incision but it is difficult to harvest the entire omentum through with this technique and therefore it is not recommended when a large bulk of omentum is needed.[5] When utilizing the transdiaphragmatic exposure, it is important to perform a radial incision in the diaphragm and to leave at least 2 to 3 cm of diaphragm attached to the chest wall. This makes closure technically easier while avoiding injury to phrenic nerve branches, which spread, medial to lateral, from the point where the phrenic nerve reaches the diaphragm.

Before starting the dissection, it is important to understand the blood supply to the omentum. The omentum is supplied by the right and left gastroepiploic arteries as well as extensive collateral blood flow via the arcade of Barkow. A rotational flap, based off one of the gastroepiploic arteries, can be created to easily reach the apex of the thoracic cage. a. = artery.

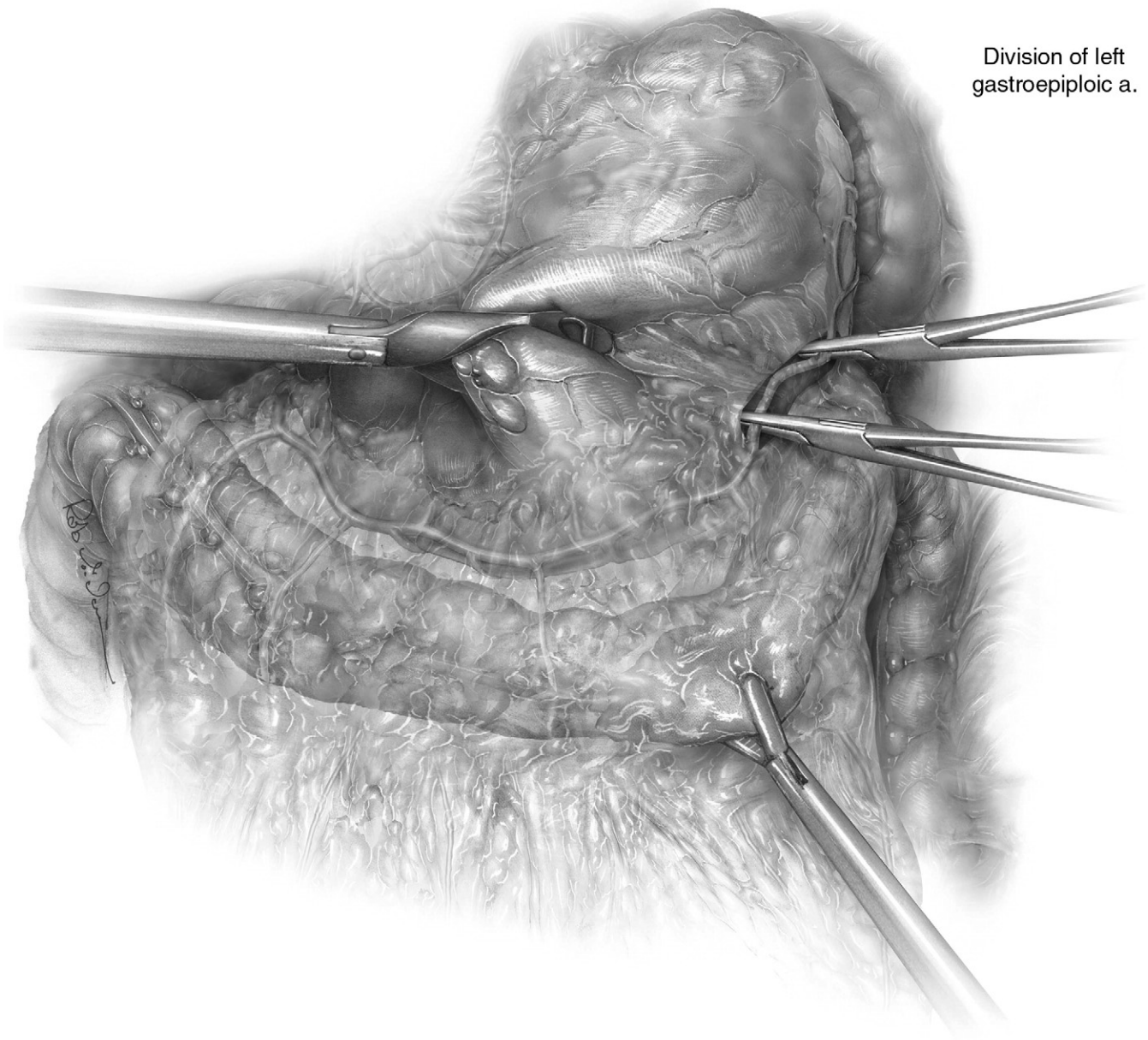

Figure 2 A pedicle is created by basing the rotational flap off of the gastroepiploic artery that is on the same side as the defect that needs to be repaired. For a right-sided thoracotomy, the left gastroepiploic artery is ligated near the spleen. Likewise, for a left-sided thoracotomy, the right gastroepiploic artery is ligated near the pylorus. The omentum is dissected off of the stomach along the greater curvature, paying careful attention to preserve the gastroepiploic vessel arch in the omentum. This is commonly performed using energy devices or ligation and division of the vessels. The omentum is more sensitive to careless technique when basing the pedicle off the left gastroepiploic artery because the right gastroepiploic artery provides the dominant blood flow to the greater omentum.

When performing a right-sided thoracotomy, it is vital to mobilize the omentum to a point lateral to the pylorus, while leaving a small rim of omentum behind. This prevents kinking of the pylorus due to traction on the stomach by the cephalad intrathoracic placement of the omentum. Clinically, this presents as a gastric outlet obstruction that requires immediate revision. a. = artery.

Figure 3 The mobilization is begun by dissecting the omentum along the avascular embryologic fusion plane along the transverse colon. This part of the procedure is commonly performed with electrocautery. The dissection is facilitated by cephlad retraction of the omentum and caudad countertraction on the transverse colon.

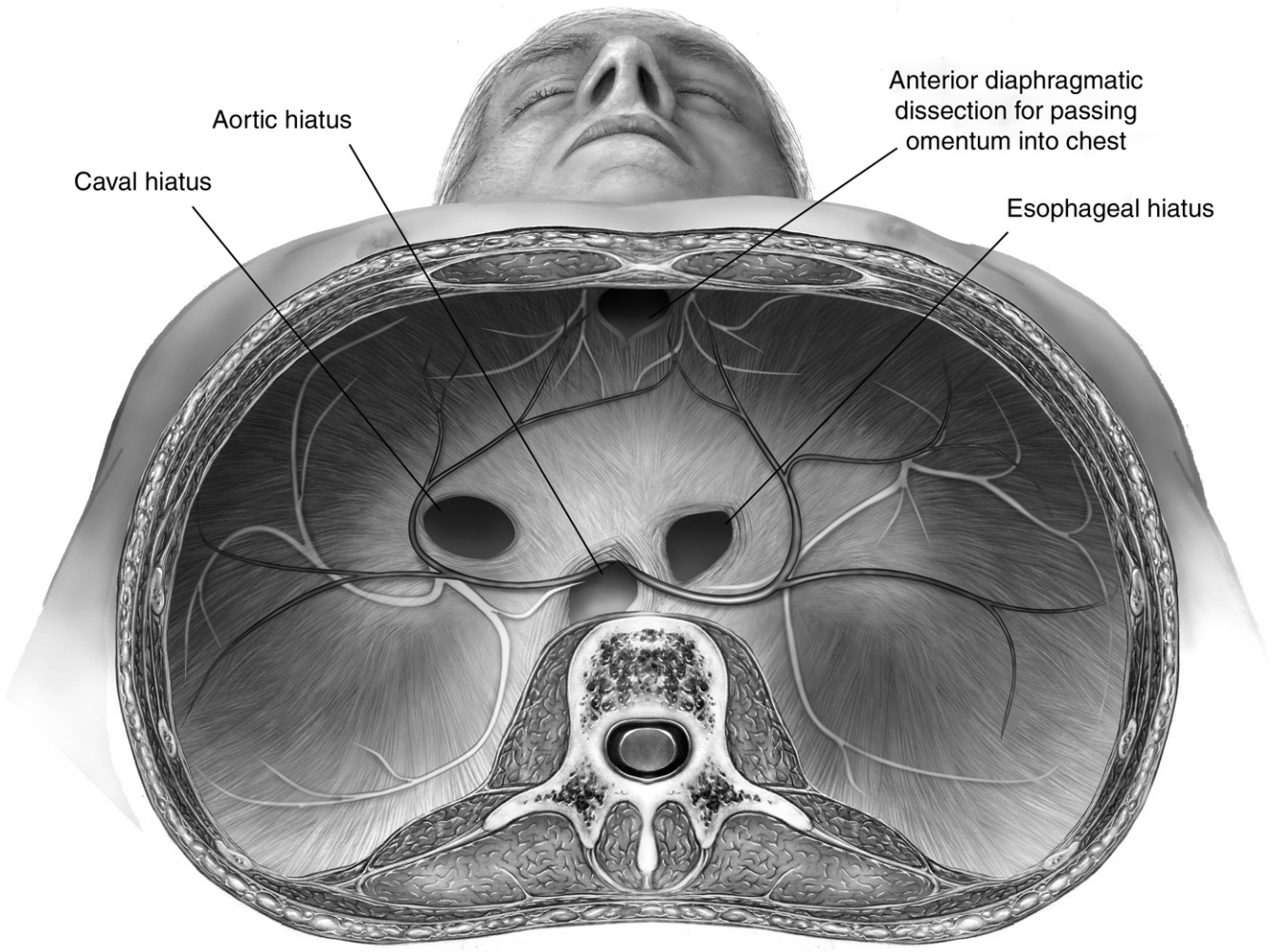

Figure 4 A small vertical, muscle splitting, retrosternal subxyphoid window is created to allow passage and placement of the omentum into the pleural space. Alternatively, the omentum can be placed in the subxyphoid space, and the incision closed.

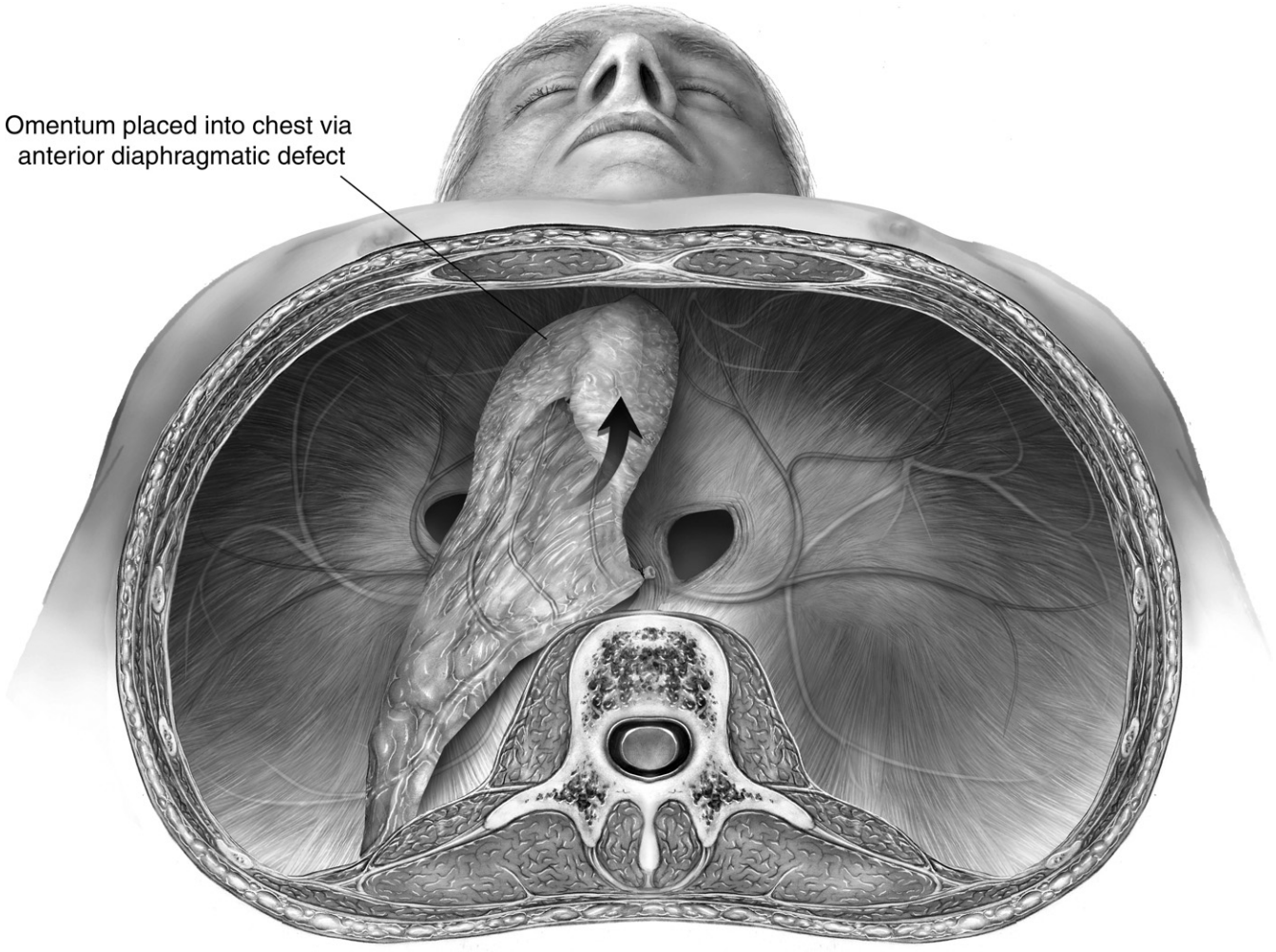

Figure 5 The omentum is passed into the thoracic cavity, paying careful attention to not angulate the pedicle, to preserve the vascular supply to the pedicle.

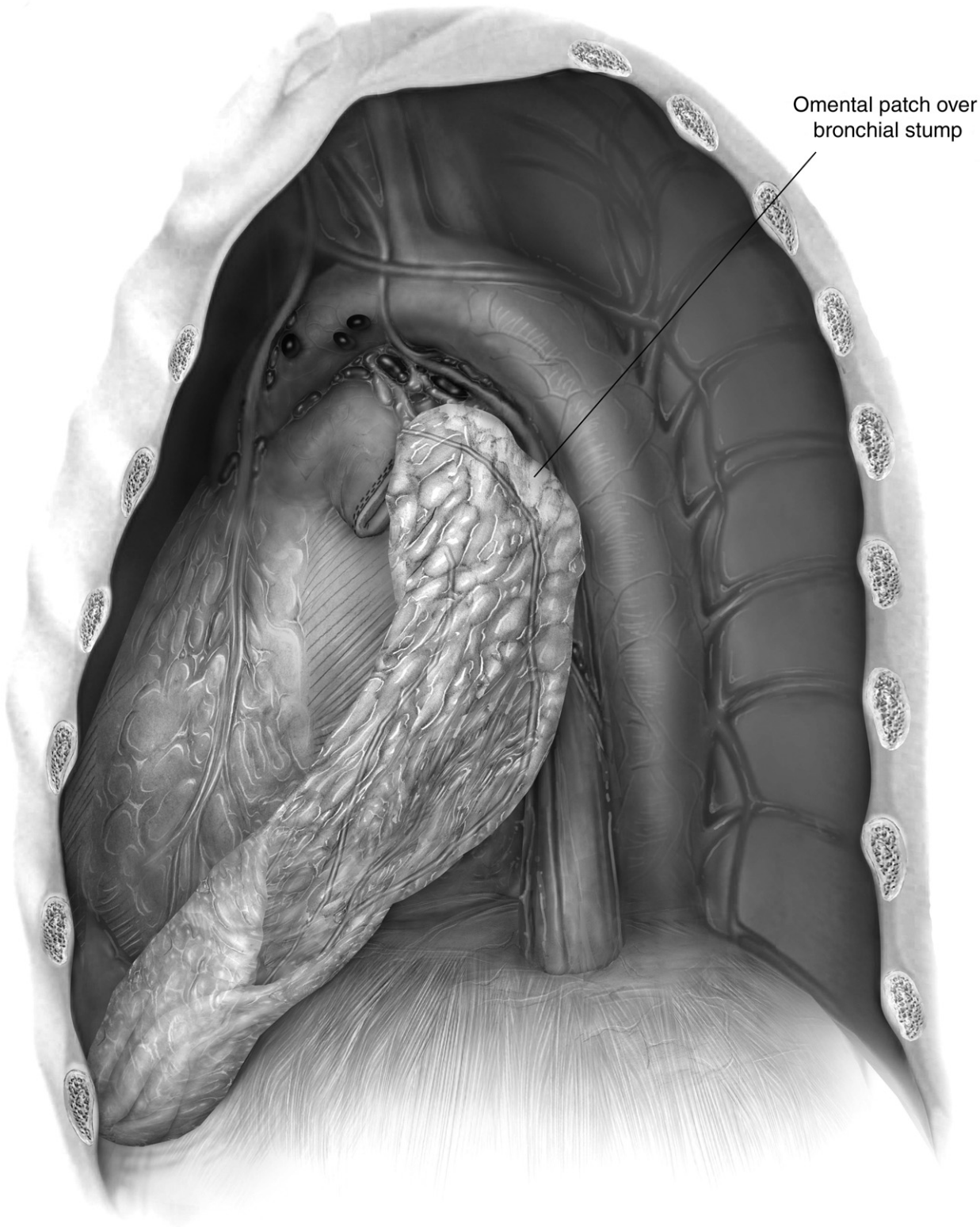

Figure 6 The omental pedicle flap is then positioned in the intended anatomic location, checked for viability, and secured in place with sutures placed to ensure the flap will remain immobile without compromising the blood flow.

Conclusions

In summary, the omentum is an excellent choice for repairing a wide range of thoracic defects. Various approaches include an upper midline incision, laparoscopy, or thoracotomy with a transdiaphragmatic incision. The author currently favors an upper midline incision, in the supine position, followed by a thoracotomy, in the lateral decubitus position. Complications associated with omental harvest are rare and include ileus, bowel obstruction, gastric outlet obstruction, diaphragmatic herniation, omental necrosis, and abdominal fascial dehiscence. One must remember that many patients requiring an omental flap are already ill, due to their previous complication, and there-

fore, great care must be taken during omental harvesting to avoid further problems.

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